The 8th Trumpeter Swan Society Conference

September 9 - 11, 1982

MSU - Kellogg Biological Station Conference Center
3700 East Gull Lake Drive, Hickory Corners, Michigan 49060

Hosted by

The Kellogg Bird Sanctuary
The Michigan Department of Natural Resources
and The Trumpeter Swan Society

Welcome

The Kellogg Bird Sanctuary of the Michigan State University-Kellogg Biological Station, and the Wildlife Division of the Michigan Department of Natural Resources, take great pleasure in welcoming representatives of The Trumpeter Swan Society, federal and state agencies, and private individuals interested in the well-being of this magnificant species of waterfowl.

The Kellogg Bird Sanctuary has an early tie with the Trumpeter Swan, dating back to the 1920's. In 1929 a shipment of nine Trumpeter Swan was purchased from F. E. Blaauw of Holland ($2500 for the lot). Upon further checking we find that Blaauw's stock originated from cygnets obtained from Red Rock Lakes in 1913.

During the last 50 years many wetlands have disappeared from the eastern United States' landscape. Human population has increased 1000-fold still key areas remain that might accept restoration of the Trumpeter Swan. The research and development required to accomplish this will be a challenge.

We are pleased to be able to share in a small way in this pioneering effort and wish the Society much success. - R. D. Van Deusen

The Trumpeter Swan Society

The Trumpeter Swan Society is an international scientific and educational organization that was founded in the autumn of 1968. The Society is composed of conservationists, biologists and citizens from across Canada and the United States. These members share an interest in the conservation of Trumpeter Swans and in restoring them to their former range and abundance.

Specific goals of The Society include:

To assist in perpetuating the Trumpeter Swan as a living member of the wild birds of our world;

To promote research into the ecology and management of the Trumpeter Swan;

To advance the science and art of Trumpeter Swan management, both in captivity and in the wild;

To restore the Trumpeter Swan in its original range;

To be a focal point for assembling all possible data on the Trumpeter Swan;

To provide a framework for the exchange of knowledge about the Trumpeter Swan; and

To provide a common meeting ground for all who are interested in the Trumpeter Swan.

Regular Membership in The Society costs $10.00. Provisions are available for Student and Retired Members as well as Family, Supporting, Contributing, Life and Corporate Memberships. As a Member, your active participation will be sought. You will receive The Trumpeter Swan Society Newsletter as it is published quarterly and all papers, abstracts or proceedings of The Society's biennial conferences. Membership blanks are available.

Objectives of the Eighth Conference

Upon invitation The Trumpeter Swan Society selected the MSU-Kellogg Biological Conference Center, Hickory Corners, Michigan as a meeting site to bring our concerns and program to eastern members and to others interested in environmental protection and restoration.

Our theme could well be, "Returning the Trumpeters to Eastern North America."

The main objectives of the Eighth Conference are:

1. To focus attention on the eastern ancestral range of the Trumpeter Swan.
2. To learn about the National, Provincial, State, and private plans and programs to restore and manage Trumpeter Swans within their ancestral range.
3. To monitor the status of the several wild populations and flocks of Trumpeter Swans.
4. To monitor the status of captive Trumpeters and to recruit aviary managers' assistance in promoting Trumpeter Swan research and restoration.
5. To study Mute Swan challenges in potential Trumpeter Swan habitat and to learn as much as possible about their ecology that could benefit Trumpeter Swan.
6. To promote membership in The Trumpeter Swan Society.

Conference Arrangements and Acknowledgements

The 8th Trumpeter Swan Conference is hosted by the Michigan State University Kellogg Bird Sanctuary and the Michigan Department of Natural Resources. Roswell Van Deusen and staff of the Sanctuary and Pat Kreuzer of the MSU-Kellogg Biological Station Conference Center are contributing many hours on arrangements. The "Facility Fee" is actually the University's bare-bone registration fee for the committee rooms, conference hall and facilities and includes the coffee/tea services. It must be paid by everyone. We believe that the meals and lodging prices are economical and we urge our travelers to use the Center's facilities. Saturday night lodging was not listed on our Reservation Form but it is available if sufficient people desire it at $12.00 each. No meals will be served on Sunday. There are no telephones in the rooms but pay phones are available in McCrary Hall and the Manor House. Messages may be received through (616) 671-5116 (day) and -4840 (nights).

The tours are free but we hope that sufficient private cars will be made available for the "Ladies Activities" on Friday and Mute Swan Area tour on Saturday. Arrangements can be made through Michigan DNR representatives for the Sunday Lake Michigan salmon fishing trip. Chartered boat prices are about $240 for a party of six for 6 hours out of Grand Haven (1 hour away) or Ludington or Manistee (2½ hours away). The charter supplies the fishing gear.

Tentative Program
The 8th Trumpeter Swan Society Conference
MSU-Kellogg Biological Station Conference Center
Hickory Corners, Michigan September 9-11, 1982

Wednesday, September 8, 1982		
3-5 p.m.	Reception, Registration, TTSS Membership	McCrary Hall
6:00 p.m.	Dinner in McCrary Hall	
7-9 p.m.	Restoration Committee, Chm Don Hammer	3rd fl Manor House
Thursday, September 9, 1982		
7:00 a.m.	Breakfast	McCrary Hall
8:00 a.m.	Reception, Registration, Membership and Field Trip Sign-up	
Opening	The 8th Trumpeter Swan Conference	McCrary Hall Auditorium
9:00 a.m.	Opening Remarks	Conference Host, R. D. Van Deusen
9:10 a.m.	Welcome to W. K. Kellogg Biological Station	George Lauff
9:20 a.m.	Welcome to Michigan	U.S.Rep. MI 3rd Dist. Howard Wolpe
9:40 a.m.	Response to Welcome	Harold H. Burgess
9:50 a.m.	History and Goals of TTSS	Ray St Ores
10:10 a.m.	The Relation of USFWS Policies to TTSS and other Swan Fanciers	Harvey Nelson
10:30 a.m.	Introductions, Announcements, Coffee/Tea Break	
Swan Status Session		Chairman, Dave Weaver
11:00 a.m.	The Swans of North America	Harold Prince
11:15 a.m.	Trumpeter Swan on Alaska Breeding Grounds	Bruce Conant
11:35 a.m.	The Status of Trumpeter Swan in British Columbia and Yukon Territory	Rick McKelvey
11:55 a.m.	Announcements	
12:00 noon	Lunch	McCrary Hall
1:00 p.m.	Canada's Interior Trumpeters	Bruce Turner
1:20 p.m.	U.S.Interior Trumpeters	Gene Stroops
1:40 p.m.	Status Report of the Lacreek Trumpeter Flock and Management Plan	Rolf Kraft
Trumpeter Swan Restoration		Chairman, Bob Jones
2:00 p.m.	Analysis of Trumpeter Swan Habitat on the Targhee National Forest	Mary Maj
2:20 p.m.	History of the Trumpeter in Eastern United States	Don Hammer
2:30 p.m.	Announcements, Coffee/Tea Break	
3:00 p.m.	USFWS Policies on Trumpeter Restoration	George Brakhage
3:20 p.m.	Trumpeter Swan in Ontario	Harry Lumsden
3:40 p.m.	Announcements	
4:00 p.m.	Tour Kellogg Bird Sanctuary	Joe Johnson
	Committee Meetings etc.	H. H. Burgess
6:00 p.m.	Dinner	McCrary Hall
7-9 p.m.	Popcorn and Film Sessions on Swan Behavior etc.	Auditorium
	Poster Session - R. D. Van Deusen	Auditorium
Friday, September 10, 1982		
7:00 a.m.	Breakfast	McCrary Hall
8:00 a.m.	Reception, Registration, TTSS Membership and Field Trip sign-up	
8:30 a.m.	Ladies' Activities	
Trumpeter Swan Restoration (continued)		
8:30 a.m.	Proposed Minnesota Trumpeter Restoration	Carrol Henderson
8:50 a.m.	Reintroduction of Wintering Trumpeter Swan to Missouri	Jim D. Wilson/Dick Vaught/John Smith
9:10 a.m.	Potential Michigan Trumpeter Restoration	Ed Mikula/Victor Janson
9:30 a.m.	Management of Captive Trumpeters for Restoration	C. A. "Art" Hughlett
9:50 a.m.	Announcements Coffee/Tea	

ABSTRACTS

The Swans of North America. Harold H. Prince, Department of Fisheries and Wildlife, Michigan State University, East Lansing, Michigan 48824

Four species of swans are found in North America. Trumpeter Swan (Cygnus buccinator) is the only species unique to this continent. Swans are large birds ranging in size from a minimum of 4.8 kg for an adult female Whistling Swan (Cygnus columbianus) up to a maximum of 17.3 kg for an adult male Trumpeter Swan. Aquatic plants and invertebrates are the normal foods. Swans can be either resident or migratory. All species have a permanent pair bond. They nest in wetland areas and incubate clutches of 4 or 5 eggs for periods of 30 to 38 days. Breeding ranges of native swan species are restricted primarily to Alaska and northwest Canada while feral populations of Mute Swan (Cygnus olor) have become established in former Trumpeter Swan breeding range in the central and eastern United States. Wintering populations of Trumpeter Swans are restricted to western United States and Canada and Whistling Swans are found in Chesapeake Bay and western United States.

Trumpeter Swans on Alaskan Breeding Grounds. Bruce Conant, U. S. Fish and Wildlife Service, P.O.Box 1287, Juneau, Alaska 99802

The Alaska breeding grounds support 98% of the Pacific coastal population and 88% of the world population of the trumpeter swan (Cygnus buccinator). A brief review of the historical background for trumpeter swan surveys in Alaska is given. Complete statewide surveys have been conducted in 1968, 1975, and 1980 and are scheduled for 5-year intervals in conformity with the international range-wide survey program. The aerial survey technique being used in Alaska is explained. The breeding ground survey data are being entered into a computer system for quick retrieval, plotting, and analysis. A sample of maps are being surveyed in interim years to monitor population trends. The U. S. Fish and Wildlife Service in Alaska plans to continue to monitor our breeding population of trumpeter swans with annual sampling and range-wide surveys every 5 years to enhance the understanding and management of this majestic bird.

The Status of the Trumpeter Swan in British Columbia and the Yukon Territory. Rick McKelvey, Canadian Wildlife Service, Box 340, Delta, B.C. V4K 3Y3

Segments of the world trumpeter swan population (Olor buccinator) breed in, winter in and migrate through, British Columbia and the Yukon. The summering population consists of approximately 100 birds in the south eastern Yukon, about 15 birds in the Ft. Nelson area, about 30 birds in the Ft. St. John area and approximately 10 birds at other scattered locations in British Columbia. Wintering concentrations are found primarily in coastal areas but a significant population winters east of the coast mountains, in the Caribou-Chicotin area and Prince George-Vanderhoof area. Winter surveys are incomplete but ¼ to ½ of the world populaton is believed to winter in British Columbia. Recent banding programs are delineating migration routes and population origins. Band sightings of the Yukon population indicate that population winters in and near the tri-state area. Banded birds from the Grande Prairie, Alberta, population have been seen in north-eastern British Columbia. Banded birds from Alaska have been seen regularly in coastal areas, and birds banded during the winter in Powell River, British Columbia, have been seen in migration in the Prince George-Vanderhoof area, and near Whitehorse, Yukon Territory. Ongoing trumpeter swan research includes counts of local concentrations, banding studies at Powell River, grazing depredation studies at Comox, and the collection of distributional information through a sight record card system.

Captive Trumpeter Session		Chairman, Harry Lumsden
10:20 a.m.	The Status of Captive Trumpeter Swan	Judy Englund
10:40 a.m.	Hennepin Co. Park Reserve District Trumpeters	Judy Englund
11:20 a.m.	Propagation Program Overview-USFWS	Gene Stroops/Sandy Rubrecht
11:40 a.m.	Collecting, Hatching and Rearing Trumpeters with Lady Luck	Ken Kalenak
12:00 Noon	Announcements, Lunch Break	
1:00 p.m.	Success at Kansas City Zoo	Harry Gregory
1:20 p.m.	Hatching and Rearing Swan with Foster Parents	Joe Johnson/Conrad Fjetland/Richard Ortleib
1:40 p.m.	Captive Breeding of Whistling Swan	Joe Johnson
Mute Swan Session		Chairman, R. D. Van Deusen
2:00 p.m.	Feral Mute Swan - Problems or Challenges?	Harold H. Burgess
2:10 p.m.	Possible Expansion of Mute Swan in Yellowstone Park	Rees Madsen
2:30 p.m.	East Coast Mute Swan Problems	Larry Hindman
2:50 p.m.	Announcements Coffee/Tea Break	
3:20 p.m.	The Traverse City Mute Swan	Bob Odum/Bob Wood
3:40 p.m.	Michigan Mute Swan Management Plan	Jerry Martz/Marvin Johnson
4-6 p.m.	TTSS Biennial Business Meeting Conferees welcome - Members voting	McCrary Auditorium
7-10 p.m.	Biennial Dinner--Address by M. Pete Petosky	McCrary Hall
	Election Results	Harold Burgess
	Times and Places	Larry Gillette

Saturday, September 11, 1982		
7:00 a.m.	Breakfast	McCrary Hall
8:00 a.m.	Registration	
Trumpeter Swan Research		Chairman, Jack Wood
8:30 a.m.	Feeding Ecology of Trumpeter Swan Wintering in British Columbia	Rick McKelvey
8:50 a.m.	Energetics of Growth of Trumpeter Cygnets	Clayton Jobes/Tom Keefe
9:10 a.m.	Molt Sequences of Trumpeter Swan	Larry Gillette
9:30 a.m.	Guidelines for Trumpeter Swan Research	Jim Cooper
9:50 a.m.	Announcements Coffee/Tea Break	
Trumpeter Swan Management		Chairman, Don Hammer
10:20 a.m.	The Need to Identify Trumpeters Useful Techniques	Dave Weaver/Carrol Henderson
10:40 a.m.	Results of Marking Trumpeters	Bill Sladen
11:00 a.m.	Trumpeter Swan Collaring at Red Rock Lakes	Dick Sjostrom
11:20 a.m.	Wintering Trumpeter Swan in Washington State	Martha Jordan
11:40 a.m.	The Mid-Continent Trumpeter Swan Population Management Plan	Gene Stroops
12 Noon	Announcements, Lunch	
1:00 p.m.	That Wraps It Up	President, TTSS
1:30 p.m.	Tour of SW Michigan Mute Swan Areas	Bob Wood

Interior Trumpeter Swans of Canada. Bruce Turner, Canadian Wildlife Service #1000, 9942-108 St., Edmonton, Alberta T5K 2J5

The Trumpeter Swan formerly nested throughout the western and northwestern regions of Canada. By the early 1900's the breeding range of the interior population was reduced to a small enclave near Grande Prairie, Alberta. When first censused in 1946, the flock numbered about 100 swans. Numbers remained static until the early 1970's when the population began to increase. In 1981 the fall flight from the area totalled 252 swans. Pioneering activity appears to have been limited or unsuccessful before the 1970's but in recent years breeding pairs have successfully established in three other areas of Alberta and a substantial population has grown in northeastern British Columbia and southeastern Yukon.

The Grande Prairie Trumpeters breed in both agricultural and forested areas on rather large lakes (mean, 127 ha. range 54-394 ha) with extensive stands of emergent vegetation and an abundance of submerged macrophytes. The population migrates through the foothills region of Alberta and overwinters in Yellowstone National Park in Wyoming and Harriman State Park in Idaho.

Programs and activities designed to enchance the management of the population include:

a) a migratory bird sanctuary to provide nesting and staging habitats,
b) an annual aerial survey to monitor population status;
c) land use guidelines to control surface activities on or near trumpeter swan lakes;
d) neck-collaring to delineate migration routes and wintering areas, and
e) egg removals for transplants to other areas.

Based on recent population trends and pioneering activity the future of the population appears encouraging.

Status Report of the Lacreek Trumpeter Swan Flock and Management Plan. Rolf H. Kraft, Refuge Manager, Lacreek National Wildlife Refuge, South Rural Route, Martin, SD 57551

A total of 230 Trumpeter Swans returned to Lacreek National Wildlife Refuge following the 1981 breeding season, including 63 cygnets. Production off of the refuge was slightly better than on, with 1.6 young per pair compared to 1.2 young per pair respectively. Production on the Refuge for 1982 was 9 cygnets from 5 nesting pair after 8 eggs were transferred to the Minnesota Department of Natural Resources. Refuge habitat is improving followng carp control but winter habitat continues to be overpopulated. A plan to transfer a Trumpeter Swan family from Lacreek to Missouri in hope of reestablishing a winter migration is scheduled for implementation this summer.

Analysis of Trumpeter Swan Habitat on the Targhee National Forest. Mary E. Maj, Biology Department, Montana State University, Bozeman, MT 59717

Comparative analysis was performed on twelve lakes (4 used, 4 historically used and 4 non-used lakes by swans) in an effort to define nesting trumpeter swan habitat on the Targhee National Forest. Measured habitat variables included water chemistry (7 variables) lake morphology (9 variables), aquatic vegetation and invertebrate composition. Swan production data was collected from 1979 through 1981. In addition to measuring fifty-seven eggs collected throughout the Greater Yellowstone area, two eggs were analyzed for their nutritional composition.

Analysis of variance was used in detecting differences between months and lake groups on all habitat variables. A discriminate analysis was run using vegetational, invertebrate, water chemistry and morphometric measurements.

A management plan was designed in order to maintain the current population of swans and to protect currently used lakes. Enhancement projects were recommended with the intent of expanding and accelerating the suitability of other lakes on the Forest for swan use.

The Trumpeter Swan in Ontario. Harry G. Lumsden, Wildlife Research Section, Ministry of Natural Resources, Box 50, Maple, Ontario L0J 1E0

Trumpeter Swan bones have been recorded in some archaeological sites in southern Ontario. The early missionaries record the bird under circumstances which suggest breeding.

In northern Ontario Trumpeter Swans were recorded by fur traders in the interior of the Hudson Bay Lowlands while Whistling Swans bred along the coast. Both species were extirpated by the fur trade. Whistling Swans are now recolonizing their ancestral range along the Hudson Bay coast.

Trumpeter Swans were still being killed in Ontario in the latter part of the 19th Century, although it is not known if these birds were migrants or part of a resident population. Habitat destruction was not a factor in the disappearance of Trumpeter Swans from Ontario. The species disappeared before drainage had a significant effect on their wetland habitat. There are numerous places in the province where populations can be reestablished with reasonable expectation that they will become self sustaining.

On the Toronto waterfront, there is a small (50+) but growing population of Mute Swans. We plan to reestablish Trumpeter Swans in Ontario, first by testing Mute Swans as foster parents. This project will seek to answer a number of questions: (1) Can Mute Swans raise Trumpeter cygnets? (2) Will fostered Trumpeter cygnets become sexually imprinted to Mute Swans?

Proposed Minnesota Trumpeter Swan Restoration. Carrol L. Henderson, Department of Natural Resources, Cedar Street, St Paul, MN 55155

In 1982 the Minnesota Department of Natural Resources initiated a project in its Nongame Wildlife Program to expand the current efforts for Trumpeter Swan restoration by the Hennepin County Park Reserve District to other areas of suitable habitat in Minnesota outside of Hennepin County. This project has been approved by the Waterfowl Policy Committee of the Minnesota DNR and the Mississippi Flyway Council.

Five cygnets (one leucistic) were hatched from a total of 8 eggs obtained from the Lacreek National Wildlife Refuge in South Dakota in June 1982. All are doing well. They have been used in a feeding ecology study to determine nutritional needs and food preferences. This information will aid in selecting eventual release sites. Future plans include obtaining eggs from Alaskan sources. Copies of the proposal for restoration of trumpeter swans are available from the Minnesota DNR.

Reintroduction of Wintering Trumpeter Swans to Missouri. Jim D. Wilson, Ornithologist; Dick Vaught, Supervisor Wetland Management Unit; John Smith, Wildlife Research Biologist, Missouri Department of Conservation, P.O.Box 180, Jefferson City, MO

In an attempt to learn if the reestablishment of migratory behavior and the recolonization of winter range can be accomplished by translocating individuals, the Missouri Department of Conservation in cooperation with the U.S.Fish and Wildlife Service is obtaining Trumpeter Swan families from nesting areas during the post-breeding period for release at Mingo National Wildlife Refuge, a former and suitable wintering locality. Adults, rendered flightless until winter, may lead their young back to nesting areas in spring. Ideally, behavior to migrate between the two localities will become established in the young. Radio-telemetry and the sighting of collared birds should provide information on their movements. The project began in September 1982 with the relocation of one family from Lacreek National Wildlife Refuge. One or two families will be relocated during the following two years.

Potential Restoration of Trumpeter Swan in Michigan. Edward J. Mikula, Victor Janson, Wildlife Division, Department of Natural Resources, P.O.Box 30028, Lansing, MI 48909

French Canadian voyageurs and trappers were the first Europeans to visit Michigan in the 1600 and 1700's, but the English cleared the deciduous forest of southern Michigan and established agriculture and other land-use practices in the 1800's. The Trumpeter Swan was extirpated from the state during the settlement period. If funding can be developed for a nongame program, plans have been made to reintroduce the Trumpeter Swan to Michigan. Public attitude toward swans developed by interaction with the state's 1500 feral Mute Swan population must be carefully considered. Loss of some Trumpeters can be expected during introduction due to vandalism, lead poisoning and accidental shooting.

The Management of Captive Trumpeter Swans in Restoration Attempts. Charles A. Hughlett, National Wildlife Refuge Association, 61500 Lobo Road, Montrose, CO

Trumpeter swans held in captivity are susceptible to a host of problems, many of which result in mortality unless constant vigilance is maintained. Careful planning of facilities may reduce the loss of birds, especially during the early months after cygnets are introduced to a new area.

This paper relates some of the experices with captive swans in the early years of the restoration effort at Lacreek National Wildlife Refuge in So Dakota. Examples of problems such as accidents, avian predation, and providing nutritious supplemental food are given and solutions are offered. Suggestions are made for a public relations/educational program that was successful at Lacreek Refuge.

The Status of Captive Trumpeter Swans. Judy Voigt Englund, Hennepin County Park Reserve District, Route 2, Box 418, Rockford, MN 55373

In March 1982, The Trumpeter Swan Society completed a status report surveying owners and propagators of Trumpeter Swans in the U.S. and Canada. This was the third biennial survey monitoring the number of swans in captivity and the number of locations having swans. The number of swans reported by survey respondents has increased from 252 in 1979 to 286 in the present survey. In addition to the 286 flightless birds, 17 Trumpeters have been released and are free-flying swans. The number of locations reporting captive swans has also increased since 1979, from 61 to 77. These increases are probably the result of a more complete survey in 1982 as well as an actual increase in both birds and locations.

Trumpeter Swans at Hennepin County Park Reserve District, MN. Judy Voigt Englund, Hennepin County Park Reserve District, Rockford, MN 55373

The Hennepin County Park Reserve District has been raising Trumpeter Swans since 1966 as part of an effort to restore the species to Minnesota. The present population of 52 birds (August 1982) is the largest ever for the District. It represents a 53 percent increase since the severe setback to the restoration program in 1980, when 20 swans died of various causes. Seventeen of the present 52 swans are free-flying birds.

Swan production in 1982 was encouraging. Six pairs of swans nested (including two free-flying pairs), laid at least 29 eggs, and hatched 19 young. One cygnet was killed by a raccoon within 24 hours after hatch, and one died of starvation, leaving 17 young as of August 1982. Only two adult swans have been lost this year. Both were killed when they flew into power lines.

Inbreeding is a concern for the District's flock, since most of the captive swans are closely related. Although problems are not yet apparent, attempts are being made to increase the genetic pool of the population.

Propagation Program Overview-U.S.Fish and Wildlife Service. Eugene Stroops and S. M. Rubrecht, Red Rock Lakes National Wildlife Refuge, Monida Star Route, Box 15, Lima, MT 59739

In 1976, it became apparent to Service personnel and aviculturists that changes for taking waterfowl and eggs from the wild for propagation purposes were needed. Swans are made available to aviculturists to encourage use for display, research, private enjoyment, development of improved propagation methods and rejuvenation of blood lines and gene pools. Specific limitations have been issued to protect the integrity of individual Trumpeter Swan populations. At Red Rock Lakes NWR up to six permits are issued annually for taking Trumpeter Swan eggs or cygnets. Hatching success and mortality information is presented for the first five years of this program. Current trends of low populations and recruitment together with marginal success by egg propagators may require discussion and possible revision of the current propagation program.

Collecting, Hatching, and Rearing Trumpeters with Lake Luck. Kenneth Kalenak, 12240 Spencer Road, Saginaw, MI 48603

I received U.S. permit and collected three Trumpeter Swan eggs at Red Rock Lakes National Wildlife Refuge, Montana in 1977. I collected 4 more eggs in 1978. All were hatched in a Sears & Roebuck Incubator and all were reared. First pair bonded at 9 months and laid first eggs at 21 months. Reared five in 1979 and nine cygnets in 1980. As of August 15, 1982 I had five Red Rock Lakes adults; had reared 24 cygnets. Other observations are reported.

Rearing Whooper Swan With Foster Parents. Joe Johnson, Kellogg Bird Sanctuary, Michigan State University, Augusta, MI 49012

In 1980 and 1981, six of seven whooper swan (Cygnus cygnus) hatched by foster parent Canada geese (Branta canadensis) and hybrid geese (Anser x Branta) were reared successfully. Foster parents were selected on the basis of security of nest site, aggressiveness, synchrony of nesting and past breeding successes. Egg weights were determined so that the total egg volume of the original clutch was not exceeded by the introduced swan eggs. Partially incubated eggs were transferred between the seventh and tenth day and incubation was completed by the foster parents. Strong family bonds occurred with the cygnets remaining with their foster parents until the next breeding season. Evaluation of foster cygnet behavior is not complete at this date. One yearling female has been observed in association with other whoopers. The remaining cygnets were isolated with parental reared "mates" and successful reproduction is not expected until the mid-80's. Under the correct conditions it would appear that trumpeter swan (Cygnus buccinator) could be reared by Canada geese. Some populations of local Canada geese are migratory, thus the establishment of migratory traditions in foster swan seems possible.

Captive Breeding of Whistling Swan. Joe Johnson, Kellogg Bird Sanctuary, Michigan State University, Augusta, MI 49012

Between 1974 and 1982, thirteen nesting attempts by whistling swan (Cygnus columbianus) have been studied with varying degrees of intensity. Two females were involved in the observations, the first a "wild" caught adult that had been held in captivity for several years and then a female offspring produced in 1975. In both pairs, the males were "wild," that is migrants that were brought to the Kellogg Sanctuary for rehabilitation. Nest initiation dates at our latitude of 42° 20' as determined by the deposition of the first egg, occurred between April 25 and May 12. Egg deposition rates, based on five observations of complete clutches averaged 1.63 days per egg. Average clutch size of 13 nests was 5.85. Renesting after the loss or disturbance of the initial nest was common. The original female laid a total of 12 eggs in 1975, 12 eggs in 1976 and 11 eggs in 1978. In four renesting attempts, no eggs have hatched. Since 1974 a total of 76 eggs have been produced of which only 21 have hatched. Beginning with the day upon which

Captive Breeding of Whistling Swan, cont'd - Joe Johnson

the last egg was laid and terminating with the day upon which the last cygnet hatched, the incubation period was determined to be no less than 27 days, with a maximum of 29 days. The cygnets are reasonably easy to rear, however management decisions concerning diet, access to swimming water and protein intake are critical. Sexual maturity in the hand reared female produced in 1975, occurred at four years of age.

Mute Swan - Problems or Challenges. Harold H. Burgess, President, The Trumpeter Swan Society, Route 5, Box 183, Liberty, MO 64068

Mute Swan management should be considered a challenge.

The Trumpeter Swan Society asks governmental agencies to ban feral Mute Swan introductions because Mutes occupy ancestral and potential Trumpeter Swan habitat. TTSS is not opposed to controlled Mute Swans. There are situations for controlled Mute Swans in people parks, fish ponds, and aviaries that are ideal.

Mute Swan may also be used as surrogates for Trumpeters in many vital studies. Mute Swan may prove useful as foster parents for Trumpeter egg transplants and cygnet restoration. They may also be useful to decoy migratory Trumpeters to adequate winter habitats.

Possible Expansion of Mute Swan in the Yellowstone Park Area. Rees L. Madsen, U.S.Fish and Wildlife Service, Monida Star Route, Box 15, Lima, MT 49739

The lack of suitable winter habitat continues to jeopardize the stability of the Mid Continent population of trumpeter swans. Recent sightings of mute swans in the traditional range of the trumpeters have caused concern about interspecific competition for the limited winter habitat. The growth of mute swan populations in other locations is reviewed.

Traverse City Mute Swans. Robert Odum and Robert Wood, Department of Natural Resources, 404 W 14th, Traverse City, MI 49684 and P. O. Box 355, Plainwell, MI 49080

The first mute swan, a pair, were introduced in 1919 in the northwest lower peninsula of Michigan in the vicinity of East Jordan. Mute swan were first observed in Traverse City in 1946. By 1968, 269 mute swan were wintering in northern Michigan and by 1982, 1016 wintered there, 400-600 of these were at Traverse City. The Traverse City mute swan flock is continuing to expand although the annual growth rate may not be a great as originally estimated. The growth rate is probably related directly to the amount of open water during the winter and the amount of hand feeding which occurs.

Michigan's Mute Swan Management Plan. Jerry Martz and Marvin Johnson, Wildlife Division, Department of Natural Resources, P. O. Box 30028, Lansing, MI 48909

Michigan's feral mute swan population expanded from one introduced pair in 1919 to over 1500 birds by February 1982. Concern over this growth associated with increased costs of winter feeding and perceived or actual conflicts with humans related to swan aggressiveness and impacts on vegetation and native wildlife prompted the Natural Resources Wildlife Division to develop a management plan. The plan goal is to stabilize mute swan numbers at about 1500 with 1000 in northern Michigan and no more than 500 in densely populated southern Michigan. Suggested control measures include translocations, egg distruction, male vasectomies, euthanasia and closer control of licensed breeders. Initial reaction to the plan has been very favorable, but it needs further refinement and additional exposure to public review.

Feeding Ecology of Trumpeter Swans Wintering in Coastal British Columbia.
Rick McKelvey, Canadian Wildlife Service, Box 340, Delta, B.C. V4K 3Y3

Large numbers of trumpeter swans (Olor buccinator) from the Alaska breeding population winter on the British Columbia coast. The habitat used most extensively is that of the estuaries of the numerous creeks and rivers found there. Principle foods are the rhizomes of the dominant emergent plants, primarily Scirpus americanus and Carex spp. as well as the fronds of Zostera marina. Feeding is regulated by tidal conditions and can be either diurnal or nocturnal. Of eight categories of behaviour studies at Comox Harbour, feeding was the dominant activity in daylight periods (37.7% of the time) while sleeping predominated during the night (41.5%) and over the total 24h period (36.0%). Swans feeding at Comox Harbour were estimated to have removed between 155.1 and 332.1g dry weight/swan/day. Swans in the Comox area have recently acquired a new food source and now make extensive use of dairy pastures. Grass consumption was estimated to be 1.2kg dry weight/swan/day. Studies of crop depredation problems and the application of management solutions are continuing at Comox.

Energetics of Growth of Trumpeter Swan Cygnets: A Preliminary Study.
Clayton R. Jobes and Thomas W. Keefe, Minnesota Dept. of Natural Resources, Forest Lake, MN 55025

At present there is no information on the energy requirements for growth of trumpeter swan cygnets. As a result, selection of release sites on the basis of acceptable food resources remains subjective. The purpose of this preliminary study was to determine cygnet preference for invertebrates (represented by mealworms) and aquatic vegetation (represented by Limna minor and Potomogeton) and to quantify intake of food items on a daily basis.

Five trumpeter swan cygnets were hatched from eggs from Lacreek National Wildlife Refuge in June 1982. At 5 days of age the cygnets were placed into experimental cells. Food items were provided in measured amounts ad libitum into baskets that were dropped into the water trough in each cell. Leftover food items were measured once per day. A commercial duck starter was also provided ad libitum. Cygnets were weighed daily to determine weight changes in relation to daily intake. At 5 weeks of age cygnets were moved to an outside pen and measurement of food intake ceased.

Discussion will include the objectives of the 3 year project of cygnet energetics to begin in 1983.

Molting Patterns of Captive Trumpeter Swans in Minnesota. Laurence N. Gillette, Hennepin County Park Reserve District, Route 2, Box 418, Rockford, MN 55373

The Hennepin County Park Reserve District keeps its flock of captive Trumpeter Swans flightless by annually clipping flight feathers. Records of clipping dates have been maintained for 9 years. These records were used to investigate the sequence of molt in subadult and adult Trumpeter Swans. The clipping dates can be roughly correlated to the date of molt. Healthy swans require approximately 30 days between molting flight feathers and growing sufficient new feathers to regain flight. Clipping is possible for about 10 days, from the time the flight feathers extend 6 inches beyond the blood quills until the bird has regained sufficient flight to avoid capture.

The mean clipping dates for yearling swans are 20 July (n=24, r=13 July to 15 August) for males and 16 July (n=24, r=10 July to 1 August) for females. This difference is negligible considering the 10 day clipping period. Second year means are 7 August (n=13, r=10 July to 3 October) and 21 July (n=17, r=10 July to 22 August) for males and females respectively. The majority of both sexes molted at the same time, but several males delayed molting for over 2 months. The means for

third year swans are 11 August (n=11, r=7 July to 4 October) and 25 July (n=9, r=17 July to 6 August) for males and females respectively. Once again, most of the males were clipped in mid- to late July, but three birds could not be clipped until September or October.

Older males deviated substantially from the normal clipping dates if they raised cygnets. On the average, these males were not ready to be clipped until 15 September (n=12) with a range from 16 August to 26 September. Non-nesting males of comparable age could be clipped on a mean date of 9 August (n=17) with a range of 7 July to 12 October. The difference between nesting and non-nesting females was much less pronounced, with means of 27 July (n=8) and 6 August (n=5), respectively.

Most Trumpeter Swans will molt between mid-June and mid-July unless they are raising cygnets. If nesting, females usually molt approximately 2 weeks after the cygnets hatch, while males delay molting until after the females have regained flight. Males usually regain flight just as the cygnets start to fly. If a nest fails or a pair does not nest following several successful nestings, the adult male may return to an earlier molting pattern.

The Need to Identify Trumpeters - Useful Techniques. David K. Weaver, Hennepin County Park Reserve District, 3800 County Road 24, Maple Plain, MN 55359; Carrol L. Henderson, Minnesota Department of Natural Resources, Box 7, 658 Cedar Street, St. Paul, MN 55155

Ranges of the Trumpeter Swan (Olor buccinator) and the Whistling Swan (O. columbianus), the two swan species native to North America, overlap. Other "look alike" species, the Mute Swan (Cygnus olor), Snow Goose (Chen hyperborea), and White Pelican (Pelecanus erythrorhynchos), oftentimes occupy areas in which native swans are seen. It is important that wildlife managers, waterfowl hunters, and public alike be cognizant of field identifying features that differentiate these species. Voices readily separate Trumpeter from Whistler in the field. Less reliable characteristics are described. Mute Swans, Snow Geese, and White Pelicans are easily identified and differentiated from Trumpeter and Whistling Swans. In-hand identification is addressed briefly. Restoration and expansion of Trumpeter Swans into the Species' historical range will expose this native swan to many who have never encountered it before. Accurate identification is necessary for proper documentation.

Wintering Trumpeter Swans in Washington State - First Year Census. Martha Jordan, 427-212th Street. SW Bothell, Washington 98011

The number of trumpeter swans in Washington State has been increasing over the past 15 years according to counts of wintering swans recorded during annual mid-winter waterfowl surveys. However, no specific statewide count of trumpeter swans had been conducted. During the winter 1981-82, a trumpeter swan census was undertaken in order to estimate swan numbers and to determine their distribution within the state. The comprehensive census occurred during a two-week period between 23 January and 7 February 1982. Data from outside the count period was collected and compiled separately.

The state was divided into six regions corresponding with those of the Washington Department of Game to facilitate collection and enhance compatibility of data with state and federal agencies. Cooperation of the U.S.Fish and Wildlife Service and WDG was vital to the project. These agencies incorporated a specific count of swans and their locations with the annual mid-winter waterfowl survey. Much of the ground survey was conducted by volunteers in order to maximize the number of observers in the field. Data collected from the survey was compiled by locality and region and filed on index cards.

Wintering Trumpeter Swans in Washington State (cont'd) - Martha Jordan

During the count period 20 observers identified a total of 458 trumpeter, 1197 whistling, and 456 unidentified swans. The first year's census efforts were concentrated in areas of known trumpeter use or areas of historical swan use. The six regions were not uniformly surveyed due to geographical barriers, lack of observers, and adverse weather conditions. Approximately 75 percent of water areas in eastern Washington were frozen and west of the mountains freezing conditions or heavy rains hampered the count efforts.

Because of the relatively small area of coverage during the count and difficulties with trumpeter swan identification, the first year's results produced a low estimate of the true number of trumpeter swans in Washington. However, this project has produced an emerging distribution map of trumpeter swans in the state.

Trumpeter Swan Collaring at Red Rock Lakes National Wildlife Refuge. Richard R. Sjostrom, U.S.Fish and Wildlife Service, Monida Star Route, Box 15, Lima, Montana 59739

A neck collaring program for marking sub-adult trumpeter swans (Olor buccinator) was initiated in 1978. The study objectives are to track movements of trumpeters into adjacent breeding habitat and to see if local swans were migrating out of the tri-state area of Montana, Wyoming and Idaho. Over 200 resightings of 60 neck collars have been collected, with no observations outside of the tri-state region. The resighting rate for 1981 through 1982 was 33 percent. Mortality on collared cygnets appeared to be a problem. Only one-year-old swans were collared after 1979. A total of 73 trumpeters have been marked as of July, 1982. Neck collar loss from breakage due to temperature extremes hampered data collection. New thicker collars are now being used. Collar specifications, materials, and procedures are discussed.

Mid-Continental Trumpeter Swan Management Plan. Eugene Stroops, Red Rock Lakes National Wildlife Refuge, Monida Star Route, Box 15, Lima, Montana 59739

This trumpeter swan population breeds in Alberta and other parts of the Canadian prairies and winters and breeds in the tri-state area of Idaho, Montana and Wyoming. At present the Canadian flock and tri-state flocks winter on Henry Fork of the Snake River, at Red Rock Lakes National Wildlife Refuge, and within Yellowstone and Teton National Parks. Due to such wintering area the population is vulnerable to unpredictable changes in numbers. Production and wintering population objectives are established. Problems which merit high priority considerations are defined. Suggested changes in management procedures and research needs are provided.

. . . about the abstracts

TTSS Directors decided that we would preprint the abstracts of the papers rather than publish the proceedings long after the conference. Priority publishing rules of scientific journals and institutions as well as the excessive pressures that publishing puts on Secretary-Treasurer Weaver and the Hennepin County Park Reserve District were elements in this decision. We have attempted the formidable task of assembling, editing, and preprinting some 37 abstracts. Several others had not arrived by our thrice postponed deadline to August 25. Copies of late papers may be available at the conference.

Ruth Burgess roughed out the write-ups and program. Ruth Van Deusen typed the abstracts and the other materials in a standard format. Artist Gail Guth

decorated the folders and arranged the poster diplay and other exhibits. Harold Burgess and Roswell Van Deusen edited the abstracts and write-ups. Changes in abstracts are the responsibility of Harold Burgess and poor communications. Palmer Envelope Company, Battle Creek, Michigan printed the program folder.

Harold H. Burgess, Roswell D. Van Deusen, Jerry Martz Co-chairmen

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